

## AMENDMENTS TO THE CLAIMS

**Claim 1 (Currently Amended)**      A substrate processing method for removing unnecessary interconnect material and barrier material on a substrate and flattening a surface of the substrate, wherein said interconnect material is embedded in interconnect recesses, said interconnect recesses being formed on a surface of an insulating material and having a film of said barrier material formed on the surface of an insulating material, said method comprising:

eliminating a level difference in the surface of the interconnect material to flatten the surface;

removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material while applying a first pressure to the substrate;

removing the interconnect material in the form of the thin film or remaining partly on the barrier material while applying a second pressure, which is lower than the first pressure, to the substrate, thereby exposing the barrier material or further processing the barrier material;

simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly while applying a third pressure to the substrate; and

removing the unnecessary interconnect material and the barrier material present in the non-interconnect region while applying a fourth pressure, which is lower than the third pressure, to the substrate, thereby exposing the insulating material in the non-interconnect region or further processing the insulating material.

**Claim 2 (Original)**      The substrate processing method according to claim 1 further comprising simultaneously removing the unnecessary interconnect material, the barrier material and the insulating material.

**Claim 3 (Currently Amended)**      A substrate processing method for removing unnecessary interconnect material and barrier material on a substrate and flattening a surface of the substrate, wherein said interconnect material is embedded in interconnect

recesses, said interconnect recesses being formed on a surface of an insulating material and having a film of said barrier material formed on the surface of an insulating material, said method comprising:

a first step of eliminating a level difference in the surface of the interconnect material to flatten the surface;

a second step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material while applying a first pressure to the substrate;

a third step of removing the interconnect material in the form of the thin film or remaining partly on the barrier material while applying a second pressure, which is lower than the first pressure, to the substrate, thereby exposing the barrier material or further processing the barrier material;

a fourth step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly while applying a third pressure to the substrate; and

a fifth step of removing the unnecessary interconnect material and the barrier material present in the non-interconnect region while applying a fourth pressure, which is lower than the third pressure, to the substrate, thereby exposing the insulating material in the non-interconnect region or further processing the insulating material.

**Claim 4 (Original)** The substrate processing method according to claim 3 further comprising a sixth step of simultaneously removing the unnecessary interconnect material, the barrier material and the insulating material.

**Claim 5 (Currently Amended)** The substrate processing method according to claim 1-~~or~~ 3, wherein the step of eliminating a level difference in the surface of the interconnect material to flatten the surface is carried out by cutting or grinding.

**Claim 6 (Currently Amended)** The substrate processing method according to claim 1-~~or~~ 3, wherein the step of eliminating a level difference in the surface of the interconnect material is carried out by CMP.

**Claim 7 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of eliminating a level difference in the surface of the interconnect material is carried out by electrolytic processing, composite electrolytic processing or abrasive processing utilizing an electrostatic or magnetic force.

**Claim 8 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of eliminating a level difference in the surface of the interconnect material is carried out by electrolytic processing utilizing a catalyst.

**Claim 9 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by CMP.

**Claim 10 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by electrolytic processing or composite electrolytic processing.

**Claim 11 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by electrolytic processing utilizing a catalyst.

**Claim 12 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by abrasive processing utilizing an electrostatic or magnetic force.

**Claim 13 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by dry etching or chemical etching.

**Claim 14 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the interconnect material present in the non-interconnect region or remaining partly on the barrier material is carried out by CMP.

**Claim 15 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the interconnect material present in the non-interconnect region or remaining partly on the barrier material is carried out by electrolytic processing or composite electrolytic processing.

**Claim 16 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the interconnect material present in the non-interconnect region or remaining partly on the barrier material is carried out by electrolytic processing utilizing a catalyst.

**Claim 17 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the interconnect material present in the non-interconnect region or remaining partly on the barrier material is carried out by dry etching or chemical etching.

**Claim 18 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by CMP.

**Claim 19 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of simultaneously removing the unnecessary interconnect

material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by composite electrolytic processing or a common electrolytic processing.

**Claim 20 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by electrolytic processing utilizing a catalyst.

**Claim 21 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by dry etching or chemical etching.

**Claim 22 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by independent processings of the interconnect material and of the barrier material.

**Claim 23 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the unnecessary interconnect material and the barrier material present in the non-interconnect region is carried out by CMP.

**Claim 24 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the unnecessary interconnect material and the barrier material present in the non-interconnect region is carried out by electrolytic processing or composite electrolytic processing.

**Claim 25 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the unnecessary interconnect material and the barrier material present in the non-interconnect region is carried out by electrolytic processing utilizing a catalyst.

**Claim 26 (Currently Amended)** The substrate processing method according to claim 1-~~or~~3, wherein the step of removing the unnecessary interconnect material and the barrier material present in the non-interconnect region is carried out by dry etching or chemical etching.

**Claim 27 (Currently Amended)** The substrate processing method according to claim 2-~~or~~4, wherein the step of simultaneously removing the unnecessary interconnect material, the barrier material and the insulating material is carried out by CMP.

**Claim 28 (Currently Amended)** The substrate processing method according to claim 2-~~or~~4, wherein the step of simultaneously removing the unnecessary interconnect material, the barrier material and the insulating material is carried out by dry etching or chemical etching.

**Claim 29 (Currently Amended)** A substrate processing method for removing unnecessary interconnect material and barrier material on a substrate and flattening a surface of the substrate, wherein said interconnect material is embedded in interconnect recesses, said interconnect recesses being formed on a surface of an insulating material and having a film of said barrier material formed on the surface of an insulating material, said method comprising:

removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly while applying a first pressure to the substrate; and then

completely removing the interconnect material, present in the non-interconnect region, in the form of the thin film or remaining partly while applying a second pressure,

which is lower than the first pressure, to the substrate, thereby exposing an underlying material present under the interconnect material in the non-interconnect region.

**Claim 30 (Original)** The substrate processing method according to claim 29, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly comprises an additional step of eliminating a level difference in the surface of the interconnect material.

**Claim 31 (Original)** The substrate processing method according to claim 29, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly is terminated when the film thickness of the interconnect material present in the non-interconnect region has reached a value of not more than 300 nm.

**Claim 32 (Currently Amended)** The substrate processing method according to claim 29 31, wherein the film thickness of the interconnect material present in the non-interconnect region is detected with an eddy current-type or optical film thickness measuring means.

**Claim 33 (Original)** The substrate processing method according to claim 29, wherein the processing rate of the interconnect material in the step of completely removing the interconnect material, present in the non-interconnect region, in the form of the thin film or remaining partly is lower than the processing rate of the interconnect material in the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly.

**Claim 34 (Original)** The substrate processing method according to claim 29, wherein the step of completely removing the interconnect material, present in the non-interconnect region, in the form of the thin film or remaining partly is carried out by using a processing liquid or a chemical liquid.

**Claim 35 (Canceled)**

**Claim 36 (Original)** The substrate processing method according to claim 29 further comprising removing the underlying material present in the non-interconnect region until a material present under the underlying material becomes exposed.

**Claim 37 (Original)** The substrate processing method according to claim 36, wherein the step of removing the underlying material comprises a step of removing the underlying material until the underlying material becomes a thin film or remains partly, and a step of removing the underlying material in the non-interconnect region until the material present under the underlying material becomes exposed.

**Claim 38 (Currently Amended)** A substrate processing method for removing unnecessary interconnect material and barrier material on a substrate and flattening a surface of the substrate, wherein said interconnect material is embedded in interconnect recesses, said interconnect recesses being formed on a surface of an insulating material and having a film of said barrier material formed on the surface of an insulating material, said method comprising:

simultaneously removing the unnecessary interconnect material and barrier material until the barrier material present in the non-interconnect region of the substrate becomes a thin film or remains partly while applying a first pressure to the substrate; and then

removing the unnecessary interconnect material and the barrier material in the form of the thin film or remaining partly while applying a second pressure, which is lower than the first pressure to the substrate, thereby exposing an underlying material present under the barrier material in the non-interconnect region.

**Claim 39 (Canceled)**

**Claim 40 (Currently Amended)** A substrate processing apparatus for performing the substrate processing method according to claim 1, comprising:



an electrolytic processing section, provided with an end point detection device, for carrying out electrolytic processing of a substrate held by a substrate holder;

a CMP section, provided with an end point detection device, for carrying out chemical mechanical polishing of the substrate held by a substrate holder; and

a substrate transfer device for transferring the substrate;

wherein the substrate is processed both in the electrolytic processing section and in the CMP section.

**Claim 41 (Original)** The substrate processing apparatus according to claim 40, wherein the electrolytic processing includes composite electrolytic processing, electrolytic processing using an electrolytic solution, electrolytic processing utilizing a catalyst, and a common electrolytic processing.

**Claim 42 (New)** The substrate processing method according to claim 3, wherein the step of eliminating a level difference in the surface of the interconnect material to flatten the surface is carried out by cutting or grinding.

**Claim 43 (New)** The substrate processing method according to claim 3, wherein the step of eliminating a level difference in the surface of the interconnect material is carried out by CMP.

**Claim 44 (New)** The substrate processing method according to claim 3, wherein the step of eliminating a level difference in the surface of the interconnect material is carried out by electrolytic processing, composite electrolytic processing or abrasive processing utilizing an electrostatic or magnetic force.

**Claim 45 (New)** The substrate processing method according to claim 3, wherein the step of eliminating a level difference in the surface of the interconnect material is carried out by electrolytic processing utilizing a catalyst.

**Claim 46 (New)** The substrate processing method according to claim 3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by CMP.

**Claim 47 (New)** The substrate processing method according to claim 3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by electrolytic processing or composite electrolytic processing.

**Claim 48 (New)** The substrate processing method according to claim 3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by electrolytic processing utilizing a catalyst.

**Claim 49 (New)** The substrate processing method according to claim 3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by abrasive processing utilizing an electrostatic or magnetic force.

**Claim 50 (New)** The substrate processing method according to claim 3, wherein the step of removing the interconnect material until the interconnect material present in the non-interconnect region of the substrate becomes a thin film or remains partly on the barrier material is carried out by dry etching or chemical etching.

**Claim 51 (New)** The substrate processing method according to claim 3, wherein the step of removing the interconnect material present in the non-interconnect region or remaining partly on the barrier material is carried out by CMP.

**Claim 52 (New)** The substrate processing method according to claim 3, wherein the step of removing the interconnect material present in the non-interconnect region or remaining partly on the barrier material is carried out by electrolytic processing or composite electrolytic processing.

**Claim 53 (New)** The substrate processing method according to claim 2, wherein the step of removing the interconnect material present in the non-interconnect region or remaining partly on the barrier material is carried out by electrolytic processing utilizing a catalyst.

**Claim 54 (New)** The substrate processing method according to claim 3, wherein the step of removing the interconnect material present in the non-interconnect region or remaining partly on the barrier material is carried out by dry etching or chemical etching.

**Claim 55 (New)** The substrate processing method according to claim 3, wherein the step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by CMP.

**Claim 56 (New)** The substrate processing method according to claim 3, wherein the step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by composite electrolytic processing or a common electrolytic processing.

**Claim 57 (New)** The substrate processing method according to claim 3, wherein the step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by electrolytic processing utilizing a catalyst.

**Claim 58 (New)** The substrate processing method according to claim 3, wherein the step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by dry etching or chemical etching.

**Claim 59 (New)** The substrate processing method according to claim 3, wherein the step of simultaneously removing the unnecessary interconnect material and the barrier material until the barrier material present in the non-interconnect region becomes a thin film or remains partly is carried out by independent processings of the interconnect material and of the barrier material.

**Claim 60 (New)** The substrate processing method according to claim 3, wherein the step of removing the unnecessary interconnect material and the barrier material present in the non-interconnect region is carried out by CMP.

**Claim 61 (New)** The substrate processing method according to claim 3, wherein the step of removing the unnecessary interconnect material and the barrier material present in the non-interconnect region is carried out by electrolytic processing or composite electrolytic processing.

**Claim 62 (New)** The substrate processing method according to claim 3, wherein the step of removing the unnecessary interconnect material and the barrier material present in the non-interconnect region is carried out by electrolytic processing utilizing a catalyst.

**Claim 63 (New)** The substrate processing method according to claim 3, wherein the step of removing the unnecessary interconnect material and the barrier material present in the non-interconnect region is carried out by dry etching or chemical etching.

**Claim 64 (New)** The substrate processing method according to claim 4, wherein the step of simultaneously removing the unnecessary interconnect material, the barrier material and the insulating material is carried out by CMP.

**Claim 65 (New)**      The substrate processing method according to claim 4, wherein the step of simultaneously removing the unnecessary interconnect material, the barrier material and the insulating material is carried out by dry etching or chemical etching.